

User Attitude Toward Screen Readers: A Finnish Perspective

Full Paper

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Abstract

Prior research on understanding blind people's attitude toward screen readers has been scant. This paper collected data from six Finnish blind users on their use of screen readers and analyzed the data using an interpretive phenomenological approach in order to find the factors that constitute attitude. The data analysis revealed three major themes: environmental, personal, and technological. Environmental themes include the following subthemes: Use Context, Government and Community Support, and Support from Friends and Family. Personal themes include subthemes of Willingness to Try New Technology, Willingness to Improve Skills, and Attachment to the Screen Readers. Finally, technological themes include Possible Improvements in Screen Readers (e.g., ease of use, slow progress of screen reader technology), Incompatibilities among Technologies, and Difficult to Learn but Training Can Support.

Keywords (Required)

Screen Reader, Blind People, User Attitude

Introduction

The stated goal of many governmental and private organizations is to create equal access to resources for all people. Toward this end, significant changes have taken place in the last decade to eliminate the existing discrimination against people with disabilities and enable them to participate in education, employment, and social communities (Hersh & Johnson, 2007). Many assistive technologies have been developed over the years for people with disabilities. Assistive technologies enable people with disabilities to participate in society as contributing members (Riemer-Reiss & Wacker, 2000). Advancements in assistive technology have enabled people with disabilities to have an improved quality of life (Borg et al., 2011; Rebelo & Soares, 2012).

There are different types of assistive technologies such as screen readers (Leporini & Paternò, 2004), braille printers (Goldberg et al., 1987), personal digital assistants (both braille and speech operated) as well as audible tactile signs and warning surfaces (Norgate, 2012). Among these, screen readers have become popular among the blind people for interacting with information technology (IT) (Brown et al., 2012; Lazar et al., 2007; McCarthy et al., 2013).

Blind people use IT to gain better mobility, to gather information, to achieve social inclusion, and to enhance their quality of life (Hersh & Johnson, 2007; Borg et al., 2011; Rebelo & Soares, 2012). Thus, to understand to what extent the governmental and private efforts in creating equal access to IT for blind people have been materialized, it is important to investigate the attitude of blind persons with screen readers. Understanding user attitude is also expected to contribute to the development of valuable design and implementation guidelines for designers of screen readers.

Prior research on understanding blind users' interaction with screen readers has been scant and only limited to investigating web navigational strategies (Vigo & Harper, 2013; Borodin et al., 2010), and user frustrations (Lazar et al., 2007). To reach the goal of universal IT usage across all user groups, more research on understanding blind people's attitude toward screen readers is needed. Consequently, we address the following research question in this paper:

RQ: What factors constitute attitude of blind people toward using screen reader technology?

To answer the research question, we collected data through six semi-structured interviews in Finland and qualitatively analyzed the data by following the interpretive phenomenological approach (IPA) (Smith, 1996, Smith et al., 1997, 1999). This helped us to gain a deeper understanding of blind people's attitude toward screen readers.

The remainder of this paper unfolds as follows. Section 2 discusses the methodology used for this paper. Section 3 presents the findings and discussions. Section 4 discusses the theoretical and practical implications of our findings. Finally, section 5 concludes the paper.

Method

Study Participants

The participants for this interpretive phenomenology approach (IPA) research were chosen from Finland. The aim of IPA is to explore in detail how participants are making sense of their personal and social world, and the main currency for an IPA study is the meanings particular experiences, events, and states hold for participants (Smith & Osborn, 2007). Initial contact was made with a local organization for visually impaired people. The local organization then facilitated interviews with 6 participants. The participants were a convenience sample (Powell 1997). They are assigned pseudo names: John, Josef, Jane, Jerry, James, and Jimmy to maintain anonymity. Each participant's background information has been described below:

John: 38 year-old male, John has been completely blind since the age of 2. He was blinded in an accident after being kicked in the head by a foal (baby horse). John was educated in IT for 3 years at a vocational school, following which he has been employed in IT helpdesk position. Through his career, he has also worked as an IT instructor.

Josef: 53 year-old male, Josef has been completely blind for more than 30 years. As a child, Josef used to have good eyesight and played regular tennis. But at the age of 10, his eyesight started getting worse, as a result of which he had to use a cane. Josef had studied programming at a university. After completing his university education, he started to work as a consultant, dealing with systems that deliver material for visually impaired people.

Jane: 44-year old female, Jane has been blind since the age of 25. Like John, Jane was blinded in an accident; she fell down while walking on an icy road. Before her blindness, Jane was an electrical engineer and had just joined a new job. But as she lost her vision, her employer was unable to continue to employ her. Later, Jane decided to improve her skills, and she currently works as an established IT trainer.

Jerry: 58-year old male, Jerry lost his eyesight at the age of 6. He was also blinded in an accident when dynamite exploded near him. Jerry went to a special school for blind people, but later switched to a normal secondary school. Jerry has been educated in law, and his current work involves looking at copyright laws related to information access across multiple channels in the context of blind people. He has received training on basic IT-related tasks, as he is needed to complete such tasks on a daily basis.

James: 49 year-old male, James has been totally blind since birth. James was educated in a blind school and then at a university. However, he failed to find a job. Later, James went back to study IT and has been employed at an IT helpdesk for visually impaired customers since 2005.

Jimmy: 41 year-old male, Jimmy has been blind since birth. Jimmy is currently registered as an official student at a university in Finland. He often participates in activities and organizations outside of his academic studies. In past, Jimmy has worked as a translator for English-Finnish-Swedish languages.

A semi-structured interview questionnaire was created following the interpretive phenomenological research guidelines to get a deeper understanding of the above participants' attitude toward screen readers. The questionnaire consisted of 27 questions, most of which were open-ended. Some of the questions focused on the lives of participants before and after the impairment. As some participants had been impaired since birth, these questions proved to be of little use. The rest of the questions aimed to understand the level of reliance on screen readers, the impact of screen readers in different contexts of

use, the extent of support for purchasing and using screen readers, and the level of satisfaction/dissatisfaction with screen readers. The complete list of questions is provided in Appendix 1.

Data Collection & Analysis

The data were analyzed using IPA (Smith, 1996, Smith et al., 1997, 1999). IPA was considered optimal for this research for three reasons. First, it has been suggested as a suitable approach when a researcher is trying to find out how individuals are perceiving a particular situation they are facing, and how they are making sense of their personal and social world (Smith & Osborn, 2007). It implies that IPA is suitable to answer broad research questions. As the research question in this paper is broad and we are not testing pre-defined hypotheses, IPA seemed to be an appropriate approach. Second, it has been suggested as an optimal approach for in-depth exploratory research with less than 10 participants (Smith et al., 1997). Since we have 6 participants in this research, it was deemed appropriate to use this methodology. Finally, IPA is suitable for a fairly homogeneous sample (Smith & Osborn, 2007). As our participants were selected based on convenience sampling and the sample is fairly homogenous, we were further convinced to use IPA in this research.

Data collection took place between August 2012 and October 2012. Each participant was interviewed once—in English—either through direct face-to-face interviews, or through Skype voice chat—whichever was convenient using the questionnaire presented in Appendix 1. The interviews lasted between 45 and 80 minutes. The open-ended questions allowed respondents to convey their experiences, views, and expression of the socially complex contexts that shape their attitude toward the screen reader. In order to aid the analysis of the data after the interviews, the interviews were recorded with each participant's consent and were subsequently transcribed by the interviewer with meticulous accuracy, often including, for example, indications of pauses, mis-hearings, apparent mistakes, and even speech dynamics where these were in any way considered remarkable by the researcher. The author also cross-examined the transcription with the audio-recordings to identify the interview themes, whilst ensuring no piece of information was accidentally omitted. In practice, the researcher adopted the following cyclical process with four iterative stages (Biggerstaff & Thompson, 2008).

First, the researcher read the texts in the transcript and took notes of any thoughts, observations, and reflections that occurred during the reading. At the second stage, the researcher moved on to re-read the text and identify themes that best captured the essential qualities of that interview. The third stage involved attempting to provide an overall structure to the analysis by relating the identified themes into clusters or concepts. The final stage was to develop a master list of themes. The themes were produced with evidence from the interview, using a quotation that the researcher felt best captured the essence of the participant's thoughts, and participant's emotions about the experience of the phenomenon being explored. The identified master list of themes is discussed in the next section.

Findings & Discussions

Based on the data analysis, it appears that most of the respondents felt similarly about critical issues that affect their use of screen reader technology. Three broad themes emerged from the data. These are environmental, personal, and technological. Under each of these themes, several sub-themes emerged. The themes and the sub-themes are shown in Figure 1.

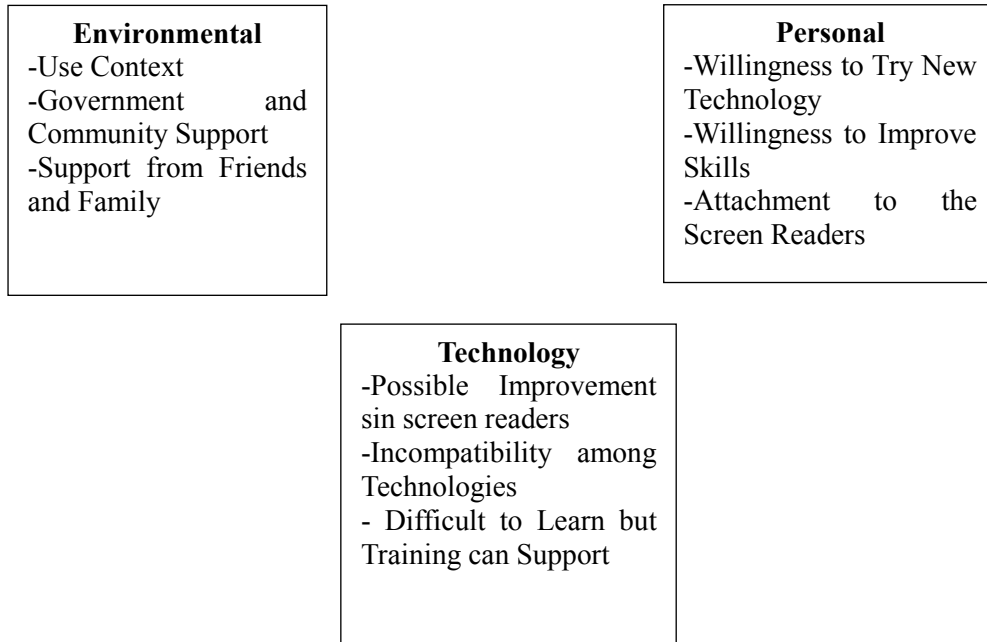


Figure 1. Themes and sub-themes from the data analysis

In the following subsections, we describe each of these themes and sub-themes.

Environmental

Use Context

Our data analysis results revealed that the same screen reader was used in both work and home environments (see Table 2). Four of 6 participants used the same screen reader in their work and home settings. Josef and Jane’s role as IT trainers necessitates them to use different screen reader technologies at home and work. This finding emphasizes the importance of understanding different usage contexts of screen readers.

User	Work Environment	Home Environment
John	JAWS	JAWS
Josef	JAWS, Voiceover, Merlow (Internal)	NVDA
Jane	JAWS, NVDA, Supernova	JAWS
Jerry	JAWS	JAWS
James	JAWS	Voiceover
Jimmy	JAWS	JAWS

Table 2. Screen reader used within work and home settings

Table 2 further shows that most of the participants use JAWS in both home and work settings. In fact, most participants suggested JAWS as the best screen reader solution on the market currently, even though some were not particularly pleased with it. This finding clearly suggests that significant improvement is necessary, even for the best screen reader on the market. Some of the quotes from the interviews are as follows:

“I have to say (the best screen reader is) JAWS, but I am not happy with it.” – Jane

“I have to say that JAWS is the best screen reader...” - Jerry

Despite wider use of screen readers, the participants noted that Braille displays are still commonly used by them, especially for programming, reading technical terms that include numbers, and reading texts in some foreign languages. Some of the sample quotes are given below:

“... If there is text which has professional/technical terms – or a lot of numbers, I like to concentrate. In which case, reading with braille is good.” – John

“Sometimes when I program, it is nice to have a possibility to read in Braille.” – Josef

“Braille is very important...when I need to work and write by myself and so on...or when I read some complete text and foreign language, I use braille display.” – Jerry

Government and Community Support

From our data analysis, we found both government and community support are important to promote screen reader usage for blind people. Our findings revealed that the Finnish government offers social and financial incentives to some extent. However, these incentives are mostly limited to those who are in full-time employment or are studying and live in major cities in Finland. This highlights that the equal access promises by the government has not been materialized, even for a developed country like Finland. Some of the sample quotes from the interviews are as follows:

“The government is doing enough, but the problem is the price. We don’t have money to install screen readers for our customers...” – John

“If you are employed, it’s easier (to get a screen reader), especially if you live in a good town. Some people get screen readers, some not...” – Josef

“Ok, they don’t do enough. And I am concerned about the people who are not working at the moment...”- Jane

Our data analysis further revealed frustration toward limited government incentives for training blind users on the screen reader technologies. The participants pointed out that training is very expensive but short. Such limited training is not sufficient for learning the technology well. Some of the sample quotes are as follows:

“It (training) comes from KELA (Social Insurance) and hospitals. You can pay yourself, but training is also expensive. And it’s not enough to get training for one or two hours—the training, ideally, should take some days.” – John

“They got their equipment from the central hospitals, but they don’t get trained. And the training is the problem, so the central hospitals are not financing the trainings...” – Jane

Overall, our findings imply that although the government is taking some steps to help blind people, expensive screen readers and the lack of sufficient training are impeding the full use of screen readers in Finland.

Support from Friends and Family

Our results revealed that friends and family also play a substantial role in supporting screen reader use. Some of the participants had partners with similar impairments, and in such cases, the home environment was comfortable. Most of the participants stated that friends and family were also willing to provide assistance when needed. Some of the sample quotes in this regard are as follows:

“My wife is also blind, and so are some of my friends, so they are ok (with me using a screen reader at home)” – John

“We both use screen readers, and if we both want to do something separately, I use headphones so that I can make sure it is my computer speaking...” – Jane

“Yes, my wife is also visually impaired, so she uses screen readers and enlarging programs. But of course, if I need help, I can get it easily.” – Jerry

Personal

Willingness to Try New Technology

Our data analysis revealed that most participants were willing to try out new screen readers and other assistive technologies due to their job requirements and personal interest. However, it should be mentioned that most of the participants are somehow involved with IT-related studies or jobs. Thus, they are not afraid to try new technology. On the other hand, Jimmy was not trained in IT and thus he was not very positive about trying new technology. The sample quotes from the interviews are as follows:

“Yes, it is part of our job—we have to know about screen readers, braille readers and magnifiers etc. If developers provide new version, we have to try to use them and test them. If someone calls and ask – we have to know new technology.” – John

“It might be difficult, but I am very curious to learn new technology.” – Jane

“I think it’s interesting to test some technology and to learn about it.” – James

“No. I wait for result. I wait for other experiences” - Jimmy

Willingness to Improve Skills

Education and training to improve skills is instrumental for career development. Most of the participants had been blind since birth or childhood. However, they all managed to earn university degrees and secure employment. Josef and Jane had become blind in their 20s. Despite their blindness, they continued to acquire new skills through education and training. For example, Jane got a job before the accident happened. However, her employer fired her, as she was not able to use computers. Later, she improved her skills by doing trainings. A sample quote from the interview with Jane is as follows:

“I had secured a job before the accident. I had a doctor evaluation. He said that I am not able to use computers with my sight, and said that I could come back when my eyes are cured. So they said goodbye and I had to leave”

“I went to the employment office, they said that they cannot do anything but know a place where they can ask (The Finnish Federation for Visually Impaired) and Federation said that after 2 weeks there will be a course for visually impaired people, and I started to take the course.

A case like Jane’s highlights the need for better awareness within the employment sector to support people with disabilities.

Attachment to the Screen Readers

Our findings revealed that screen readers allowed the participants to perform many daily activities such as reading newspapers, browsing the Internet, reading emails, social networking, writing, shop online, and managing financial activities in the bank. The participants also pointed out that they seamlessly use screen readers every day. Some of the sample quotes are as follows:

“When I am the webmaster, then I send emails and read emails using screen readers....I also used to use Facebook.” – John

“...I write programs, emails, and texts, for which I need screen readers. I use SR for all things I do.” – Josef

“I use screen readers to read newspapers, Internet, and emails.” – Jane

“I browse the web and manage my financial activities in the bank...for example listening to music. I also follow newsshop online. I enjoy doing these activities” – James

“Mostly it is so easy to use that I don’t think I am using a screen reader. It is so usual for me that I don’t think when I start a computer...that I am using a screen reader.” – John

Screen readers have played a central role in the lives of these people. Some participants even feel that the technology is a part of their lives, thus further deepening their attachment to screen readers. The following quotes reflect this:

“It’s part of my life, of course. There are so many big things I can do with computers. Screen readers really help.” – Josef

“I have to use it, and I am familiar with it. Without it, I can’t live” – Jane

“I think I am a part of technology because I like to play with the technology. So I’m a part of it. And it gives satisfaction and use in my everyday life also. Yes I’m a part of technology, yes.” – James

Technology

Possible Improvements in Screen Readers

Some participants pointed out that their experience using screen readers could be improved in several ways. They mainly commented on the slow progress of screen reader technologies compared to general computing technologies. The following sample quote reflects this:

“...the (general internet) technology is improving faster, and that is the problem, so I think they (screen readers) can be better in future...” – John

Incompatibilities among Technologies

Our findings suggest that incompatibilities among technologies may cause problems. For example, screen readers are able to read out information on the screen, but if a web page has been poorly designed, or in the case of a scanned PDF, character recognition by current screen reader technology is not possible. This finding is in line with prior research that reported on the incompatibility between screen readers and information technology (Harris, 2006; Lazar et al., 2007; Borodin et al., 2010). Our findings revealed frustrations among the participants regarding the incompatibilities among technologies. However, most of the frustrations were not directed toward the screen readers, but rather at the poorly structured web applications. The following quotes depict this:

“When the screen reader freezes, it is quite a frustration for me. One thing which always is quite restrictive is CAPTCHA...” - John

“... Sometimes some programs in my task are quite challenging. The programs don’t work very easily with screen readers.” – Jerry

“Yes, I especially have problem in Windows. That’s normal. That’s every day... It can also happen that web browser gets stuck or something.” – James

“Sometimes, when screen readers don’t work or get information, I am not angry at screen readers but angry towards those that have made the web pages. It’s their fault.” – Josef

“I sometimes have problems accessing some websites, but I don’t use those websites everyday anyway. And in that case, I ask my assistant for help” – Jimmy

Difficult to Learn but Training Can Support

Most of the participants indicated that screen readers are difficult to learn. However, proper training can make them easier to use. The following sample quotes depict this:

“You have to train. It is not difficult if you have training...” – John

“... It’s also challenging to learn how screen readers work. They are not very simple programs....” – Josef

Limitations & Implications

Our findings have a major theoretical implication. While prior research has placed some emphasis on understanding user frustrations and web navigational behaviors, our paper performed a deeper analysis on the attitude of blind users toward screen readers. Our findings revealed three broad themes, namely environmental, personal, and technological, in relation to blind people's usage of screen readers. These broad themes have been further classified into sub-themes. For example, environmental themes include use context, governmental and community support, and support from friends and family. Personal themes include the willingness to try new technology, willingness to improve skills, and attachment to the screen readers. Finally, technological themes include possible improvements in screen readers (e.g., ease of use, slow progress of screen reader technology), incompatibilities among technologies, and difficult to learn but training can support. Future research may utilize these themes to build and validate research models that may explain blind users' usage of screen readers.

Our findings have practical implications for both screen reader designers and government decision makers. First, we found a variety of use contexts (home vs. environment, technical vs. non-technical tasks) in this paper. Consequently, the designers are advised to take this into consideration and design screen readers that fulfill broader needs. Our findings further emphasized the necessity of improving the capabilities of screen readers with the fast-growing online technologies, so all web-pages and applications are easily accessible. For example, our results clearly pointed out that navigation technologies are less useful, more difficult to use, and often slow for blind people.

Second, our results highlighted the incompatibilities between screen readers and other technologies (e.g., websites, scanned PDFs). This suggests the designers along with the standardization bodies are required to work together to deal with these incompatibilities.

Finally, although the Finnish government has been trying to support blind people, the existing support is not enough. The participants noted that the existing trainings are very expensive and insufficient for learning how to use screen readers or other assistive technologies properly. Additionally, blind people who live in remote areas or are unemployed get little support from the government regarding screen readers. Thus, the government is advised to put more emphasis on planning and providing trainings to blind people on screen readers and other assistive technologies. Trainings can ensure the sustained use of screen readers.

We discuss one major limitation of our study. We had a fairly homogeneous sample from Finland. Most participants in our study were trained in IT. Their attitude toward screen readers may be significantly different from other people. Thus, future studies should involve interviews with different groups of users to find the extent to which their attitude toward screen readers differs. This kind of research will lead to the development of valuable practical guidelines for screen reader designers as well.

We discuss two major future research direction. First, we found that the use of screen readers vary considerably between home and work environment. Thus, future research may investigate why and how the use contexts vary. Second, we suggest future research to conceptualize and measure the factors that we found in this study along with attitude through surveys. The collected data can be analyzed using structural equation modeling in order to find what factors influence attitude.

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